

The Builder.

NO. 1717.

SATURDAY, MARCH 9, 1844.



AKING up for the fifth time the important subject of Bridge-building, we must conclude what we have to say at present upon arches before we resort again to piers and abutments.

21stly. Every bed-joint throughout bridge-work generally should be formed at right-angles to the course of the active drift or pressure, so that no fracture or displacing of the materials may occur from irregular or askew gravitation; thence the arch-joints, instead of

being straight inclined planes, will assume a curved form, which will not only effectuate correct gravitation of the materials,



but will also prevent the slipping out of any voussoir from the work, which indeed may be otterly prevented by each stone in the work being plugged with copper, or other proper metal, to all the other stones which adjoin each stone. In the present state of architectural tastes, we should not admire the appearance of arch-joints being so curved, but this may be only first prejudice, since if, by the nature of science, they should be so required for perfect operation, we should soon, becoming accustomed to each form, cease to dislike them, and even admire their prominent display, in the same manner as we do the flowing curvatures of nature. The pinning up tightly the key-stone, and plugging it to the adjoining stones, will in this, as in all other cases, be a matter of some difficulty, but may be partly effected by the key being horizontally somewhat wedge-shaped, so as to drive forward till tight, and by being then run with lead.

22dly. The spandrels of the arch should form part of the Catechism construction, the extrados itself being the immediate bed of the roadway.

23dly. The mere paving or other roadway, and its traffic, should be the only burden upon the arches and piers of a bridge, except the unavoidable weight of the parapets and their adjuncts.

24thly. In order to distend upwardly the spandrels of the arch, so that the extrados may form the bed of the roadway without any more burden, they should be made of lighter materials, so as to afford the requisite quantity of

resistance to fracture, without any increase of weight.

25thly. Solid arch-spandrels, formed of materials graduated in lightness in proportion to the excess of length required in order to occasion the extrados of the voussoirs to reach up to the under side of the roadway without more burthen, will be more economical and more certain in operation than open spandrels formed of harder and heavier materials, on account of the difficulty and perhaps impossibility of forming tunneled or other open spandrels, without casting weight irregularly upon some parts of the work, instead of diffusing it uniformly over the whole of every skewed surface and bed-joint of the work; so that although it is necessary that all the external work of a bridge should be of such materials as will resist the effects of moisture, air, and time, there may be cases in which the arches or their spandrels, or some other parts of the work, may be better formed of light soapstone, or even chalk, than of the hardest granite.

26thly. Having now arrived at the piers of the work, our chief theory thence is, that they should commence in bulk of the utmost united substance of the spandrels of the two arches to be supported.



27thly. If any reduction of this bulk occur, harder materials must be chosen, as, for instance, if the inclined bed-line of each spandril be 10 feet long, the band of the pier should be 20 feet wide, if the pier be of the same kind of materials as the arches; but if it be desirable, (as it may) to reduce the pier to only 10 feet wide, the material of the pier should be twice as capable of resisting fracture as that of the arches.

28thly. It may be taken as a general rule that for rebuilding bridge-piers to the smallest practicable bulk, and thence leave the greatest amount of water-way, they should be built of the hardest, most compact, and least bulky materials; but that from the use of light materials for arches result the advantages of greater depth of key-stone and spandril, whereby the voussoirs at the vertex of the work are less likely to slip through, and mere lumber is rendered unnecessary for filling out the haunches of the work for supporting the roadway.

29thly. The piers, instead of being perpendicular, should increase downwardly, so that there may be the same amount of pressure on every foot of the work down to near the foundation; but in order to prevent obstruction to the water-way under the arches, the piers may be made with small increase of width till near the foundation, but with greater increase of length the way of the stream, so as to make up for restriction of width.

30thly. Unless the foundation of a bridge be solid rock, there should be a sudden increase or spread of the work according to circumstance, so that every foot of the bed or foundation of the work (instead of being only as capable of resisting pressure as well as any course of the masonry of the pier) may be even three or four times as capable of resisting

pressure; so that notwithstanding the accident and vicissitudes to which a foundation under water are liable, there may be if possible a certain assurance of the work standing.

In our next we shall go into the theory of the Land-abutments.



METROPOLITAN BUILDING-ACT.

Houses or Lofts.—The Earl of Lincoln said he rose for the purpose of bringing in a bill for regulating the construction and the use of buildings in the metropolis and its neighbourhood. It would not be necessary for him to enter at length into the subject, as the contents of the voluminous reports which had been laid on the table of the house refer to it must be fresh in the recollection of the House, and it would be, therefore, useless on that occasion to go into any recapitulation of them. He should merely state that the report of the committee which sat in 1840 recommended a measure for the regulation of buildings in large towns, which was not only essential, but of primary importance. The first bill on that subject was brought forward in 1841 by a noble lord a member of the other House, who was then Secretary of State for the Home Department, but it did not pass in consequence of the dissolution of Parliament in that year. In 1842 it was again introduced in the House of Lords, but before the second reading in the House of Commons it was referred, by the unanimous assent of all parties, to a committee on stairs, which sat during the session without coming to any practical result, and at the end of the session the committee reported the evidence without any decision upon it. At the desire of his right honourable friend the Secretary of State for the Home Department, he (the Earl of Lincoln) looked through that evidence, with a view to the preparation of a measure on the subject for the session of 1843. He consulted several architects and surveyors on the subject, and he found that a general measure on the subject would embrace very complicated details, from the circumstances connected with the various towns that should be included, some of them, such as Liverpool, having local acts for regulating those matters, and others, such as Manchester, having no regulation upon that subject. Seeing this, it was evident that if the difficulties were overcome, that branch of the subject would afford an ample basis for a legislative measure in itself, and consequently the bill of last session was brought forward with respect to the metropolis alone; but in consequence of the great number of other measures which were also before the house, it was found impossible to proceed with it. He did not regret that it had been so, for he had frequent opportunities during the recess of introducing alterations and improvements into that measure, and he hoped that they were such as would make the measure efficient and useful to the public. Without trespassing further on the attention of the House, he would state the leading provisions of the bill which he was going to bring in. The house was aware that the present Act for regulating buildings was introduced in the reign of George the Third, about seventy years ago, and many of its details were of course inapplicable to the present condition of the metropolis. He, therefore, proposed to repeal that Act [hear]. The existing act contained provisions for the prevention of fire, and he (Lord Lincoln) intended, in the course of the present session, to bring in a separate measure on the subject of the prevention of fire in the metropolis, rather than to mix up provisions for the prevention of fire with his present bill. It was unnecessary for him to trouble the house with technical details, which would be disagreeable and unintelligible to the House; such details, for instance, as affected party-walls, and the various clauses in buildings. All he felt necessary to state was that the bill had been framed with the greatest care, and after consulting men the best qualified to give information on the subject, and he hoped it was one which would be palatable to all